BS 2853:2011

BSI Standards Publication

Specification for the testing of steel overhead runway beams for hoist blocks

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Publishing and copyright information

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 6, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 October 2011. It was prepared by Technical Committee CB/203, *Design and execution of steel structures*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard, together with BS EN 1993-6 (and its associated National Annex), supersedes BS 2853:1957, which is withdrawn.

Information about this document

This is a full revision of the standard, and introduces the following principal changes.

- The detailed requirements for structural design have been removed.
- Requirements about the slopes of beams have been added.
- It has been clarified that the deflection limits for beams are relative to their supports.
- The former references to Statutory Requirements have been removed.
- The detailed requirements for Test Certificates have been removed.
- References to The Lifting Operations and Lifting Equipment Regulations 1998 [1] have been added.

Previous editions of this British Standard also covered the structural design of the runway beams. This is now covered by BS EN 1993-6, in association with BS EN 1991-3, and their associated National Annexes.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies requirements for the testing of fixed overhead runway beams made from rolled steel sections.

This British Standard applies to the runway beams and their components only. It does not apply to supporting structures, travelling trolleys or lifting appliances operating on the beams, nor to runway beams for cranes that run on rails.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN ISO 7500-1, *Metallic materials – Verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Verification and calibration of the force-measuring system*

3 Terms and definitions

For the purposes of this British Standard the following terms and definitions apply.

3.1 certifier
person signing the certificates specified in this British Standard

3.2 runway
runway beam and runway components

3.3 runway beam
overhead track for carrying loads which are moved along it

3.4 runway components
those parts of the runway immediately attached to the runway beam, e.g. splices, end stops, clamps and switches

4 Information to be supplied

The certifier shall be supplied with full details of the loads to be handled and the service required of the runway. This information shall form the basis of the test. These loads shall include any additional items, such as apparatus or services, which might have to be supported by the runway.

5 Design

The runway beam on which the trolley moves shall be of sufficient size and strength, and have an even running surface. It shall be appropriately supported or suspended, and readily accessible for maintenance.

The design and layout of the runway beam and its supporting structure shall be such as to ensure that before the application of loads to the runway beam, its slope does not deviate by more than 1 in 250 from the horizontal, or from its intended slope.

NOTE For the structural design of runway beams, see BS EN 1991-3 and BS EN 1993-6.

6 Deflection

The maximum measured deflection of a runway beam under the safe working load, relative to its supports, shall not exceed 1/500 of the span.

For a cantilever beam, the maximum measured deflection under the safe working load, relative to its supports, shall not exceed 1/250 of the span.

7 End stops

End stops shall be provided on the runway to prevent the trolley either falling from the beams or hitting the structure of the building in which the runway is installed. The stops shall not operate on the flanges of the trolley wheels.

The end stops shall be designed to be effective for all types of trolley.

8 Testing and inspection

8.1 Duty of certifier

The person signing the certificate specified in **10.1** shall satisfy themselves that the deflections specified in Clause **6** are not exceeded and that all other requirements of this British Standard are conformed to.

NOTE The prime duty of the certifier is to test the actual runway; nevertheless they should satisfy themselves that the supports and structures are sound and suitable for all loads which they are called upon to take.

8.2 Accuracy of the loads

The loads shall be measured by a load cell calibrated to BS EN ISO 7500-1, such that the sum of the inaccuracies of the load and the load cell do not exceed ±2%.

NOTE The load referred to includes the test frame, chain slings, tackle, etc. and the load cell if used on the actual test.

8.3 Amount of the proof load

The proof load applied shall be the weight of the appropriate heaviest lifting appliance supported by the runway plus 125% of the safe working load of this appliance.

Where the runway supports more than one transporting or lifting appliance, due allowance shall be made for the permissible proximity of any other appliance or appliances supported by the runway.

8.4 Inspection before application of loads

All joints, connections and supports shall be carefully inspected, and special attention shall be paid to the security of nuts on bolts. Attention shall be paid to the condition of walls surrounding and adjacent to the end fastening of runways fixed therein.

Where the runway beam is carried on timber supports (which in many cases might be roof trusses), it shall be the responsibility of the owner to satisfy the tester that the members are suitable for the load to be carried.

NOTE It is recommended that, where reinforced concrete beams are used for the suspension of runways, the beams should be coated with whitewash or similar, to reveal any cracks that develop under the proof load.

8.5 Application of loads

Once the preliminary inspection has been carried out as specified in **8.4**, a test load equivalent to the maximum safe working load, together with the weight of the heaviest transporting or lifting appliance supported by the runway, shall be applied and traversed along the whole length of the runway. The load shall be halted at appropriate positions during its passage along the runway and kept at rest while stable deflection readings are recorded at these positions and at the corresponding support points so that net values can be determined.

For straight, simply supported runways, the net deflection shall be determined at mid-span and at cantilever ends. In other cases, sufficient readings shall be taken to ensure that the maximum net deflection has been obtained.

The procedure outlined above shall then be repeated except that:

- instead of the test load referred to in the first paragraph, the proof load (see **8.3**) shall be applied;
- the stable net deflection shall be recorded only at that position where the maximum reading was obtained during the application of the test load referred to in the first paragraph.

8.6 Deflection measuring equipment

Deflection measuring equipment shall be capable of measuring the vertical deflection of the beam at any point within ±5% of the maximum permitted deflection of the beam.

8.7 Inspection and thorough examination

During the application of the test load referred to in **8.5** and of the proof load as specified in **8.5** the runway shall be kept under such visual observation as to ensure the ready detection of any obvious defect in the runway.

Following the application of the proof load as specified in **8.5** the runway shall be thoroughly examined in order to ascertain, for the purposes of Clause **10**, that the runway has withstood the proof load without damage or permanent deformation.

NOTE 1 For the purpose of this subclause, thorough examination means a careful visual examination, supplemented, where relevant, by other tests including non-destructive testing of critical welds and checking the tightness of pre-loaded bolts, in order to arrive at a reliable conclusion as to the safety of the runway.

If dismantling is necessary for the purpose of examination, the load test and bolt tightening check shall be repeated afer reassembly.

NOTE 2 Further statutory requirements are given in The Lifting Operations and Lifting Equipment Regulations 1998 [1].

9 Marking

The safe working load, identification number and any limiting conditions shall be plainly and permanently marked on the runway so as to be clearly visible to the operator. The marking shall include either the maximum hoisting speed for a power hoist or else the words “Manual Hoist”.

NOTE The safe working load referred to here applies to the runway beam and its components only; it does not apply to a travelling trolley or lifting appliance operating on the runway beam. Hence, the actual load lifted, lowered, or transported in any particular instance, is not only governed by the safe working load of the runway beam, but also the safe working load of the trolley and lifting appliance used, and any other relevant factors, e.g. any limitation governing the operation of an adjacent trolley and lifting appliance.

10 Certificates

10.1 Certificate of test and thorough examination

Before any runway beam is taken into use the first time after erection, re-erection or having undergone any substantial alteration or repair, a certificate that the runway beam has been tested and subsequently thoroughly examined as required by **8.7** shall be supplied.

The certificate shall identify the runway beam to which it refers, quoting its distinguishing number or mark and grades of steel, its size and length, and state:

a) the date on which the proof load was applied and thorough examination made;

b) the position and magnitude of the deflections obtained during the traversing of the maximum safe working load and of the proof load as required by **8.5**;

c) the maximum safe working load; and

d) that the runway beam conforms in all respects to this British Standard, i.e. BS 2853:2011. [1)]

The certificate, which shall be signed by the person making the test and examination, shall indicate clearly that it applies to the runway beam only and not to any trolley or lifting appliance travelling thereon.

NOTE Further statutory requirements are given in The Lifting Operations and Lifting Equipment Regulations 1998 [1].

10.2 Certificate of thorough examination

When a thorough examination only is made of a runway beam already in use and for which a certificate of test and thorough examination as referred to in **10.1** has been granted, the certificate of such examination shall identify the runway beam to which it refers, quoting its distinguishing number or mark and grades of steel, its size and length, and state:

a) the date on which the examination was made;

b) the date of the certificate of test and thorough examination referred to in **10.1**; and

c) particulars of any defect found during the examination and affecting the maximum safe working load and of the steps taken to remedy such defect.

The certificate, which shall be signed by the person making the examination, shall indicate clearly that it applies to the runway beam only and not to any trolley or lifting appliance travelling thereon.

NOTE Further statutory requirements are given in The Lifting Operations and Lifting Equipment Regulations 1998 [1].

[1)] Marking BS 2853:2011 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 1991-3, *Eurocode 1 – Actions on structures – Part 3: Actions induced by cranes and machinery.*

BS EN 1993-6, *Eurocode 3 – Design of steel structures – Part 6: Crane supporting structures*

Other publications

[1] GREAT BRITAIN. The Lifting Operations and Lifting Equipment Regulations 1998. London: HMSO.

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